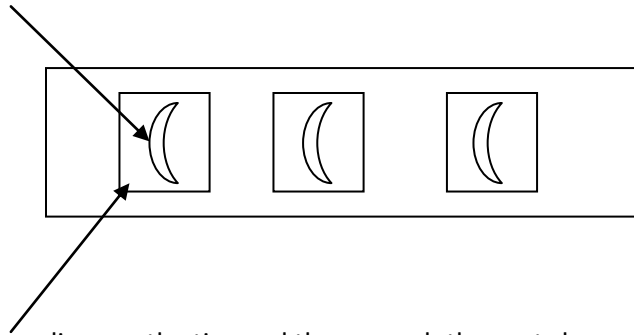


### Cell Division Lab Procedures

1 group member performs the following procedures for CAFFEINE treated root tips, another partner performs procedures for the CONTROL treated root tips (Water alone or water mixed with caffeine)

1. Place 3 root tips on a paper towel and trim the root to 3-5 mm in length (be sure to keep the tip). Place the 3 tips across the center of a glass microscope slide as shown:



2. Place a coverslip over the tips and then squash the roots by gently pressing down with the eraser-end of a pencil. Repeat pressing down until you get clear squashes as shown on the demo slide.

The squash looks messy on the slide! Focus on the bottom of the tip called the meristem. When you observe the slide under the microscope, scan for the cells that are smaller and more square in shape. Count the number of cells in a single field of view that are in mitosis and those in interphase.

Create data tables where you can record the number of cells in INTERPHASE and the number of cells in the MITOTIC PHASE (any of the phases of mitosis).

Example:

	Control		Caffeine	
	Interphase	Mitotic Phase	Interphase	Mitotic Phase
Root Tip 1				
Root Tip 2				
Root Tip 3				

### DATA ANALYSIS- CHI SQUARE

1. For this experiment, the number of treated cells in interphase and mitosis will be the observed (o) values.
2. To find out what your expected values are, complete the following steps:
  - a. Calculate the percentage of cells in interphase and mitosis in the control group from Table 1.
  - b. Multiply the percentages by the total number of cells in the treated group; this will give the expected numbers (e).
3. Calculate the chi-square ( $\chi^2$ ) value for the test.
4. Compare this value to the critical value on your AP formula sheet
5. The degrees of freedom (df) equals the number of groups minus one. In this case, there are two groups, interphase and mitosis; therefore,  $df = 2 - 1$ , or 1.
6. The p value is 0.05, and the critical value is 3.84. If the calculated chi-square value is greater than or equal to this critical value, then the null hypothesis is rejected. If the calculated chi-square value is less than this critical value, the null hypothesis is accepted.

### Cell Division Lab Report

1. Introduction: Discuss the cell cycle process, its significance during growth, development & reproduction. Transition into its regulation, and consequences of disruptions. End by stating the purpose and NULL hypothesis.
2. Procedures: Include all pertinent steps & materials. Don't forget proper format!
3. Results: Include your data tables that have the data from the actual lab day. Summarize them with a caption underneath each table. Create pie graphs showing time spent in each mitotic phase for the 2 data sets (control/cafeine)
4. Analysis: Include ALL chi square calculations with EXPLANATIONS of how the chi square supports or refutes the null hypothesis. Perform a t-test also, and remember rule...t-test is more powerful! Use the data to discuss how the results match what you feel should have logically happened or not.
5. Conclusion: Discuss the relevance of your findings to the scientific community. Address any possible errors and deviations from expected results, and possible reasons for those deviations. Finally, discuss some extensions to what we did and how they would be better/more effective.